Weekly Report

***Period**: 04/13/2014 – 04/20/2014*

Projects

Research

This week, I was revising the TVCG paper. All questions by reviewers was answered with more carefully proofreading required in the next week. As long as I finished a version, I will send a copy to Prof. Zhang. Hopefully, we can submitted the revised version in the end of this month.

【DTI Atlas】

In addition, I investigated the efficiency issue of our CellHash structure for DTI fibers and came up with a new version. Specifically, we do not stored the fiber information in each 3D cell. Instead, we store all fibers into disk pagers. All fiber points are stored in a consecutive disk space. To support fast random access, a CellHash based spatial index is built of which each cell records all fibers passing this cell. Figure 1 shows an overview of this new fiber repository structure.

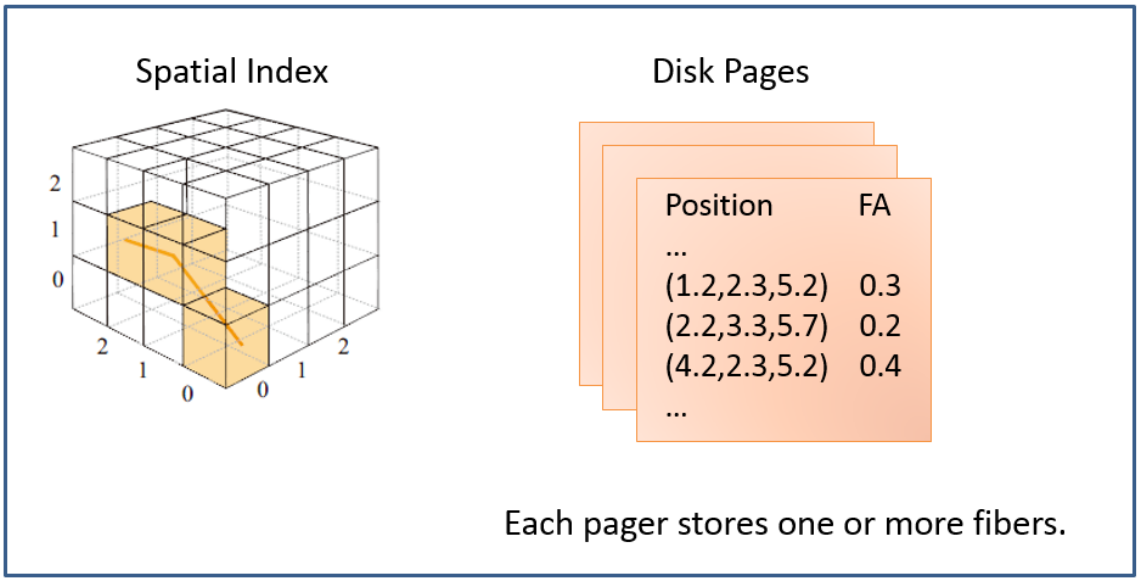

Figure 1 The cell hash based fiber repository

To overcome high page exchange overload, spatially similar fibers should be stored in the same disk page. We formulate this problem as a classification problem. The classifier stores all fibers in a same cluster into a set of disk pages. Since the DTI fibers normally have different number of fiber points, the conventional vector based classification algorithms cannot be directly employed. Our method employ a lazy algorithm. Specifically, we first randomly select ***m*** fiber models. Then we use the spectral cluster algorithm to group the fibers in these fiber models into ***k*** clusters. To classify a fiber, we

first compute the distances of this fiber to all cluster medoids. The fiber will be appended at the disk pages specified by the nearest medoids of this fiber.
Furthermore, I drafted a mockup of our new query based DTI fiber atlas exploration system (See Figure 2).

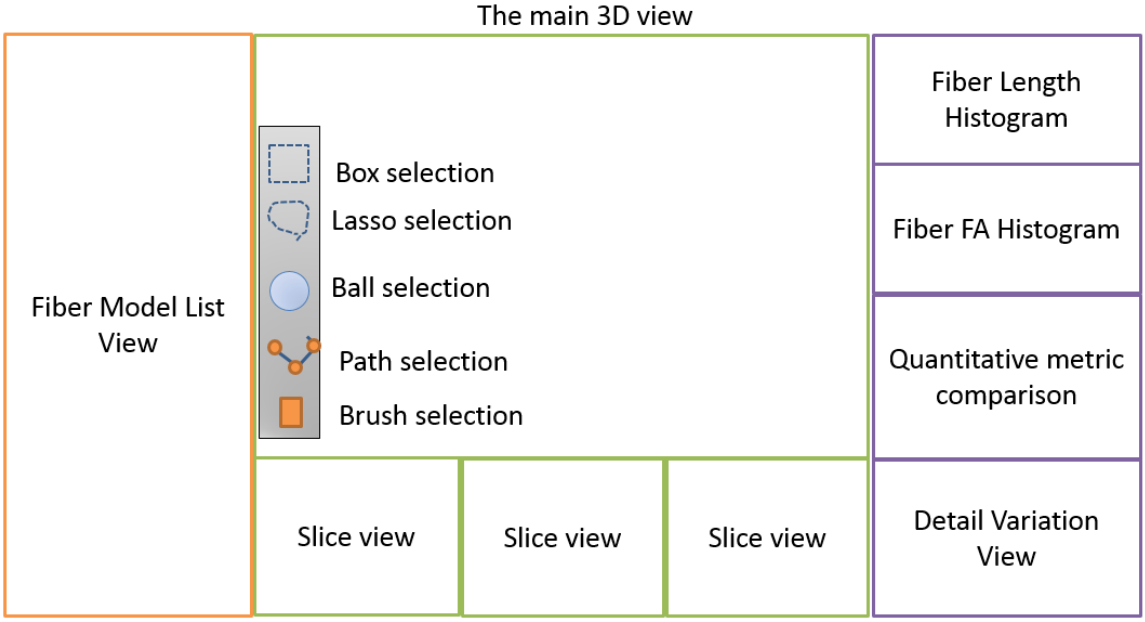

Figure 2 The main interface of the new system

Work to be done in next week

- Prepare the weekly group paper report
- Revise the TVCG paper
- Implement our cluster-projection based fiber exploration system

Reference: